CLAIMS

1. A method of positioning a selected recording channel on a recording head relative to an optical servo system in a read/write assembly comprises:

positioning the optical servo system at a first position relative to the selected recording channel in the read/write assembly;

processing an alignment tape in the read/write assembly to determine a lateral offset between the optical servo system and the selected recording channel; and

positioning the optical servo system at a second position relative to the selected recording channel using the lateral offset.

2. The method of claim 1 wherein the alignment tape includes a track of longitudinal equally spaced apart alignment voids.

3. The method of claim 2 wherein processing comprises:

writing a track of data to the alignment tape over the track of alignment voids;

imaging a section of the alignment tape to determine a lateral distance between a center of the track of alignment voids and a center of the track of data; and

setting the lateral offset to the lateral distance.

4. The method of claim 3 wherein imaging comprises placing the section of alignment tape under a Magnetic Force microscope.

5. The method of claim 3 wherein imaging comprises placing the section of alignment tape under an optical microscope using ferrofluid.

6. The method of claim 3 wherein the lateral distance is measured in micrometers(μm).

7. The method of claim 1 wherein the second position is laterally upward from the first position if the lateral offset is a negative number.

8. The method of claim 1 wherein the second position is laterally downward from the first position if the lateral offset is a positive number.

9. The method of claim 3 wherein imaging further comprises:

determining an average lateral distance between several alignment voids and the track of data; and

setting the lateral offset to the average lateral distance.

10. The method of claim 2 wherein processing comprises:

writing and subsequently reading a track of data to a front major surface of the alignment tape on the track of alignment voids with a write head and a read head of the selected recording channel;

monitoring a bit-error ratio (BER) from reading the track of data; and

correlating the bit-error ratio (BER) to the lateral offset.

11. The method of claim 10 wherein correlating comprises relating a maximum BER to the lateral offset.

12. The method of claim 11 wherein a negative lateral offset value indicates the optical servo system is laterally above the selected recording channel.

13. The method of claim 11 wherein a positive lateral offset indicates the optical servo system is laterally below the selected recording channel.

14. The method of claim 10 wherein the BER represents a number of erroneous data bits read divided by the total number of data bits written.

15. The method of claim 2 wherein processing comprises:

providing a plurality of longitudinally arranged equally spaced apart alignment void tracks on the alignment tape;

moving the recording head across the tracks in a motion perpendicular to a motion of the alignment tape;

writing and reading a magnetic signal to the alignment tape by the selected recording channel at a higher frequency than the frequency of alignment voids moving past the selected recording channel to determine an amplitude demodulated magnetic signal;

directing a beam of light by the optical servo system to the alignment tape to determine an optical signal; and

determining a timing difference between the envelope of the demodulated magnetic signal and the envelope of the optical signal.

16. The method of claim 15 wherein determining comprises the timing difference between a peak in the envelope of the demodulated magnetic signal and a peak in the envelope of the optical signal.

17. The method of claim 15 wherein determining comprises calibrating the timing difference using the velocity measured

from the timing difference between peaks in the envelope of the optical signal.

18. The method of claim 15 wherein determining comprises the cross-correlation function to find the timing difference between the envelope of the demodulated magnetic signal and the envelope of the optical signal.

19. The method of claim 17 wherein the velocity is determined from the separation of peaks in the cross-correlation function.

20. The method of claim 16 wherein the lateral offset is set equal to the timing difference divided by the velocity.

21. The method of claim 2 wherein processing comprises:

providing a plurality of longitudinally arranged equally spaced apart alignment void tracks on the alignment tape;

moving the recording head across the tracks in a motion perpendicular to a motion of the alignment tape;

directing multiple beams of light by the optical servo system to the alignment tape to determine a number of optical signals; and

determining a timing difference between the envelope of one optical signal and the envelope of another optical signal.

22. The method of claim 21 wherein the optics are rotated to bring the timing difference divided by the velocity to a desired value.

23. The method of claim 21 wherein determining comprises the cross-correlation function to find the timing difference between the envelope of one optical signal and the envelope of another optical signal.

24. The method of claim 1 wherein the alignment tape comprises:

a plurality of longitudinal tracks on a second major surface of the tape; and

recording channel positioning alignment voids.

25. The method of claim 24 wherein processing comprises:

suspending the alignment tape in a coupon;

positioning the alignment tape with the coupon over a recording channel pair to position a line from one element of a channel pair to another; and

positioning the optical servo system such that one generated optical spot is centered on a middle one of the longitudinal tracks and other generated optical spots are offset by a desired amount.

26. The method of claim 24 wherein the plurality of tracks are generated by passing the tape through a laser system.

27. The method of claim 25 wherein positioning comprises:

viewing the alignment tape under a microscope; and

adjusting the alignment tape's position with a precision translation and rotation stage attached to the coupon.

28. An alignment tape for positioning a selected recording channel of a recording head relative to an optical servo system in a read/write assembly comprises:

an elongated continuous web of flexible plastic substrate material having two edges and defining a front major surface and a back major surface;

a magnetic storage medium formed on the front major surface;

an inert medium formed on the back major surface; and

a track of alignment voids for indicating actual lateral displacement of the selected recording channel relative to the optical servo system.

29. The tape of claim 28 wherein the track of alignment voids is formed by ablation by a pulsating laser beam of sufficient power to penetrate the back major surface through to the front

major surface leaving visible the flexible plastic substrate of the alignment tape.

30. A method of positioning a selected recording channel on a recording head relative to an optical servo system comprises:

fixedly positioning the optical servo system at a position relative to the selected recording channel;

processing an alignment tape to determine a lateral offset between the optical servo system and the selected recording channel; and

storing the lateral offset.

31. The method of claim 30 further comprising aligning a data track with the selected recording channel using optical servo system and the stored lateral offset during tape travel across the selected recording channel.